

¿Qué podemos hacer con Motus?

What can we do with Motus?



Publications

The following is a list of publications that are based on Motus data. If you are affiliated with a project that has used data collected through Motus, we encourage you to add any additional publications not already listed.

Please use the following citation formats for all publications and reports. If Motus data are used in your analysis, the citation should be as follows:

[Data owner name]. 2019. [Dataset name]. Data accessed from the Motus Wildlife Tracking System. Birds Canada. Available: <http://www.motus.org/>. Accessed: [Date].

If Motus graphics or tools are used in your analysis the citation should be as follows:

Birds Canada. 2019. Motus Wildlife Tracking System. Port Rowan, Ontario. Available: <http://www.motus.org>. Accessed: [Date].

Search motus publications (by year, title or author):

Click on a reference for more details. More titles and search options are available within the Zotero group.

Bani Assadi, Saeedeh, and Kevin Charles Fraser. "Experimental Manipulation of Photoperiod Influences Migration Timing in a Wild, Long-Distance Migratory Songbird." *Biological Sciences* 288, no. 1957 (August 25, 2021): 20211474. <https://doi.org/10.1098/rspb.2021.1474>.

Wilcox, Alana A E, Amy E M Newman, Nigel E Raine, Greg W Mitchell, and D Ryan Norris. "Captive-Reared Migratory Monarch Butterflies Show Natural Orientation." *Conservation Physiology* 9, no. 1 (January 1, 2021). <https://doi.org/10.1093/conphys/coab032>.

Imlay, Tara L., Hilary A. R. Mann, and Philip D. Taylor. "Autumn Migratory Timing and Pace Are Driven by Breeding Season Carryover Effects." *Animal Behaviour* 2021, no. 101616. <https://doi.org/10.1016/j.anbehav.2021.05.003>.

Bégin-Marchand, Camille, André Desrochers, Philip D. Taylor, Junior A. Tremblay, Lucas Berriga, and Andrew T. Beauchamp. "Regional Convergence among Eastern Populations of Swainson's Thrushes." *Movement Ecology* 2021, no. 1. <https://doi.org/10.1007/s12573-021-10261-2>.

Tatten, Jessica. "Factors Influencing Stopover and Movement of Migratory Songbirds within the Amherst, 2021." https://scholarworks.umass.edu/masters_theses_2/1026/.

Roux, Courtney E. le, and Joseph J. Nocera. "Roost Sites of Chimney Swift (*Chaetura Pelagica*)." <https://doi.org/10.1002/ece3.7235>.

Morbey, Yolanda E., Andrew T. Beauchamp, Simon J. Bonner, and Greg W. Mitchell. "Evening Local Songbirds." *Journal of Avian Biology* 51, no. 11 (2020). <https://doi.org/10.1111/j.1365-3113.2020.00711.x>.

Wilcox, Alana A. E., Amy E. M. Newman, Nigel E. Raine, Greg W. Mitchell, and D. Ryan Norris. "Experimental Manipulation of Photoperiod Influences Migration Timing in a Wild, Long-Distance Migratory Songbird." *Biological Sciences* 288, no. 1957 (August 25, 2021): 20211474. <https://doi.org/10.1098/rspb.2021.1474>.

Loring, P. H., A. K. Lenske, J. D. McLaren, M. Aikens, A. M. Anderson, Y. Aubrey, E. Dalton, A. Dey, C. Friis, and D. Hamilton. "Tracking Movements of Migratory Songbirds in the Continental Shelf Region." OCS Study, Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM, 2021. <https://www.boem.gov/ocseis/renewable-energy/studies/tracking-migratory-shorebirds-atlantic-ocs-study>.

Clerc, Jeff, R. Mark Brigham, Justin G. Boyles, and Liam P. McGuire. "A NASBR History of Radiotelemetry: How Technology Has Contributed to Advances in Bird Conservation." *Foundations and New Frontiers*, edited by Burton K. Lim, M. Brock Fenton, R. Mark Brigham, Shahroukh Mistry, Allen Kurta, Erin H. Gilam, Amy Russell, and Joann M. Stenseth. Cham: Springer International Publishing, 2021. https://doi.org/10.1007/978-3-030-54727-1_15.

Richie, Marina. "New Tracking Tools Reveal Bird Migration Secrets." *BirdWatching*. Accessed January 21, 2021. <https://www.birdwatchingdaily.com/news/scientific-research/migration-secrets/>.

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Birnie-Gauvin, Kim, Robert J. Lennox, Christopher G. Guglielmo, Amy K. Teffer, Glenn T. Crossin, D. Ryan Norris, Kim Aarestrup, and Steven J. Cooke. "The Value of Migration Biology." *Physiological and Biochemical Zoology* 93, no. 3 (February 3, 2020): 210–26. <https://doi.org/10.1086/708455>.

Miller, Aroha. "Marine Protected Areas: Expanding, but under Protected," 2020. <https://oceanwatch.ca/howesound/wp-content/uploads/sites/2/2020/08/OceanWatch-MarineProtectedAreas.pdf>.

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Desrochers, André, Junior A. Tremblay, Yves Aubry, Dominique Chabot, Paul Pace, and David M. Bird. "Estimating Wildlife Tag Location Errors Using Drone-Based Telemetry." *Drones* 2, no. 4 (December 2018): 44. <https://doi.org/10.3390/drones2040044>.

Evans, Dean R. "The Post-Fledging Survival and Movements of Juvenile Barn Swallows (*Hirundo Rustica*): An Automated Telemetry Approach." PhD Thesis, University of Guelph, 2018.

Hutchins, Michael, Peter P. Marra, Ed Diebold, Michael D. Kreger, Christine Sheppard, Sara Hallager, and Colleen Lynch. "The Evolving Role of Telemetry in Bird Conservation." *Zoo Biology* 37, no. 5 (September 1, 2018): 360–68. <https://doi.org/10.1002/zoo.21438>.

Bianchini, Kristin, and Christy A. Morrissey. "Assessment of Shorebird Migratory Fueling Physiology and Departure Timing in Relation to Polycyclic Aromatic Hydrocarbon Exposure." *Environmental Science & Technology*, October 26, 2018. <https://doi.org/10.1021/acs.est.8b04571>.

Dowling, Zara R., and Danielle I. O'Dell. "Bat Use of an Island off the Coast of Massachusetts." *Northeastern Naturalist* 25, no. 3 (August 1, 2018): 405–15. <https://doi.org/10.1002/2017.045.025.0302>.

> 200 publicaciones desde 2014

> 200 publicaciones since 2014

<https://motus.org/data/publications>

State-Space Models Reveal Unobserved off-Shore Nocturnal Migration of Songbirds.

Landbirds: Lessons Learned in the Golden Age of Bio-Logging.

Light Affect the Timing of Nocturnal Departures in a Migratory Songbird.

Telemetry System: Tracking Local Space Use of Aerial Insectivores.

Telemetry Technique for Wildlife Position Estimation Using Non-Synchronous Telemetry.

Schmaljohann, Heiko, Florian Müller, Thomas Klinner, and Cas Eikenaar. "Potential Age Differences in the Migratory Behaviour of a Nocturnal Songbird." *Journal of Avian Biology*, 2018. <https://doi.org/10.1111/jav.01815>.

Vliet, Heidi E. J. Van, and Bridget J. M. Stutchbury. "Radio-Tagged Fledgling Savannah Sparrows *Passerculus Sandwichensis* at Risk of Entanglement." <https://doi.org/10.1111/ibi.12615>.

Wright, James R., Luke L. Powell, and Christopher M. Tonra. "Automated Telemetry Reveals Staging Behavior in a Declining Migratory Passerine." <https://doi.org/10.1642/AUK-17-219.1>.

Smetzer, Jennifer. "Tracking Migratory Bird Movements in the Gulf of Maine with Automated Radio Telemetry and Stable Hydrogen Isotope Markers." <https://doi.org/10.1002/ece3.7235>.

Cooper, Nathan, David Ewert, Kimberly Hall, Sarah Rockwell, Dave Currie, Jr Wunderle, Jennifer White, and Peter Marra. "Resighting Data Reveals Breeding Grounds in a Range-Restricted and Endangered Long-Distance Migratory Passerine." *Avian Conservation and Ecology* 13, no. 1 (March 2018): 1–10. <https://doi.org/10.1002/ece3.7235>.

Müller, Florian, Cas Eikenaar, Zoe J. Crysler, Philip D. Taylor, and Heiko Schmaljohann. "Nocturnal Departure Timing in Songbirds Facing Distinct Migration Routes." *Animal Ecology*, March 5, 2018. <https://doi.org/10.1111/1365-2656.12821>.

Loring, Pamela, Robert Ronconi, Linda Welch, Philip Taylor, and Mark Mallory. "Postbreeding Dispersal and Staging of Common and Arctic Terns." <https://doi.org/10.1002/ece3.7235>.

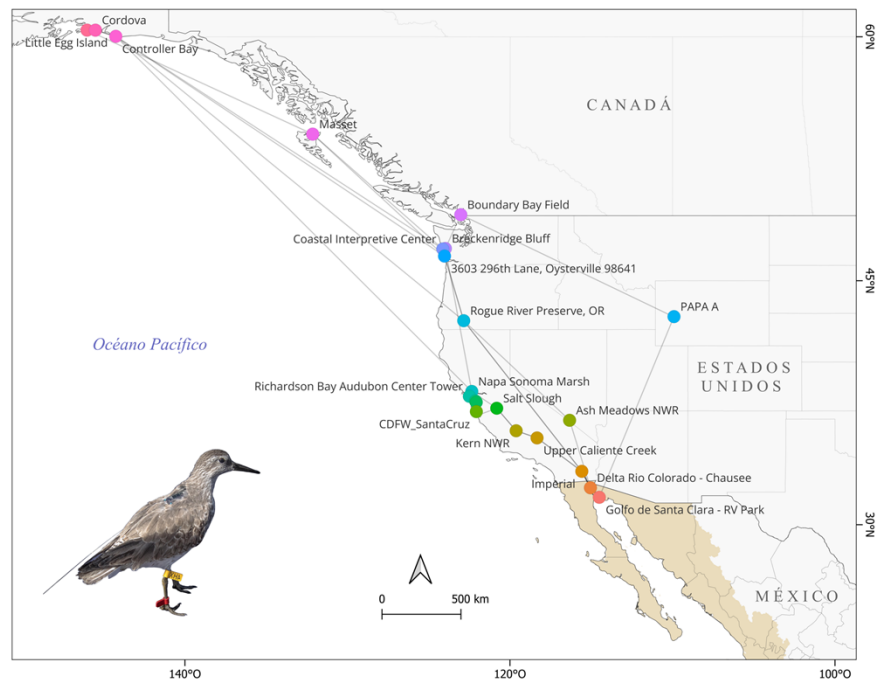
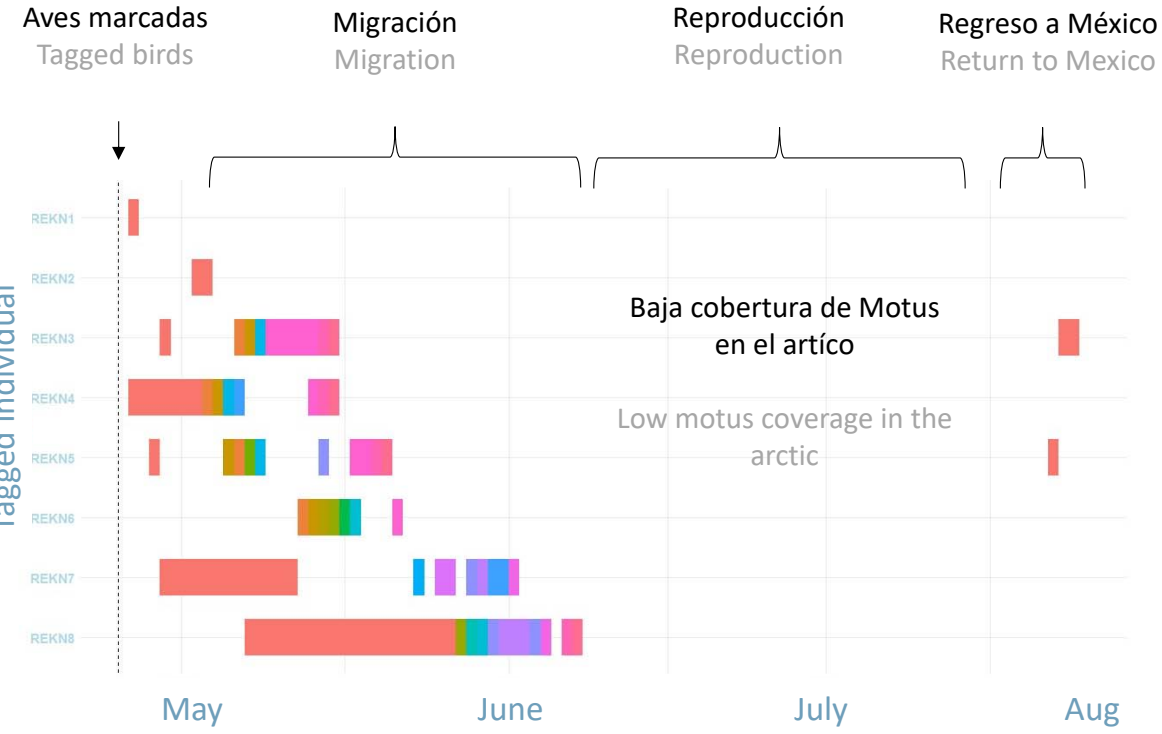
Parametros migratorios

Migratory parameters

¿Cuál es su tiempo de llegada, estadía y partida?
What is their arrival, stopover and departure timing?

¿Conectividad migratoria?
Migratory connectivity?

¿Supervivencia?
Survival?



Estrategias migratorias

Migratory strategies

Ruta Valle California Central de California



Estrategias migratorias

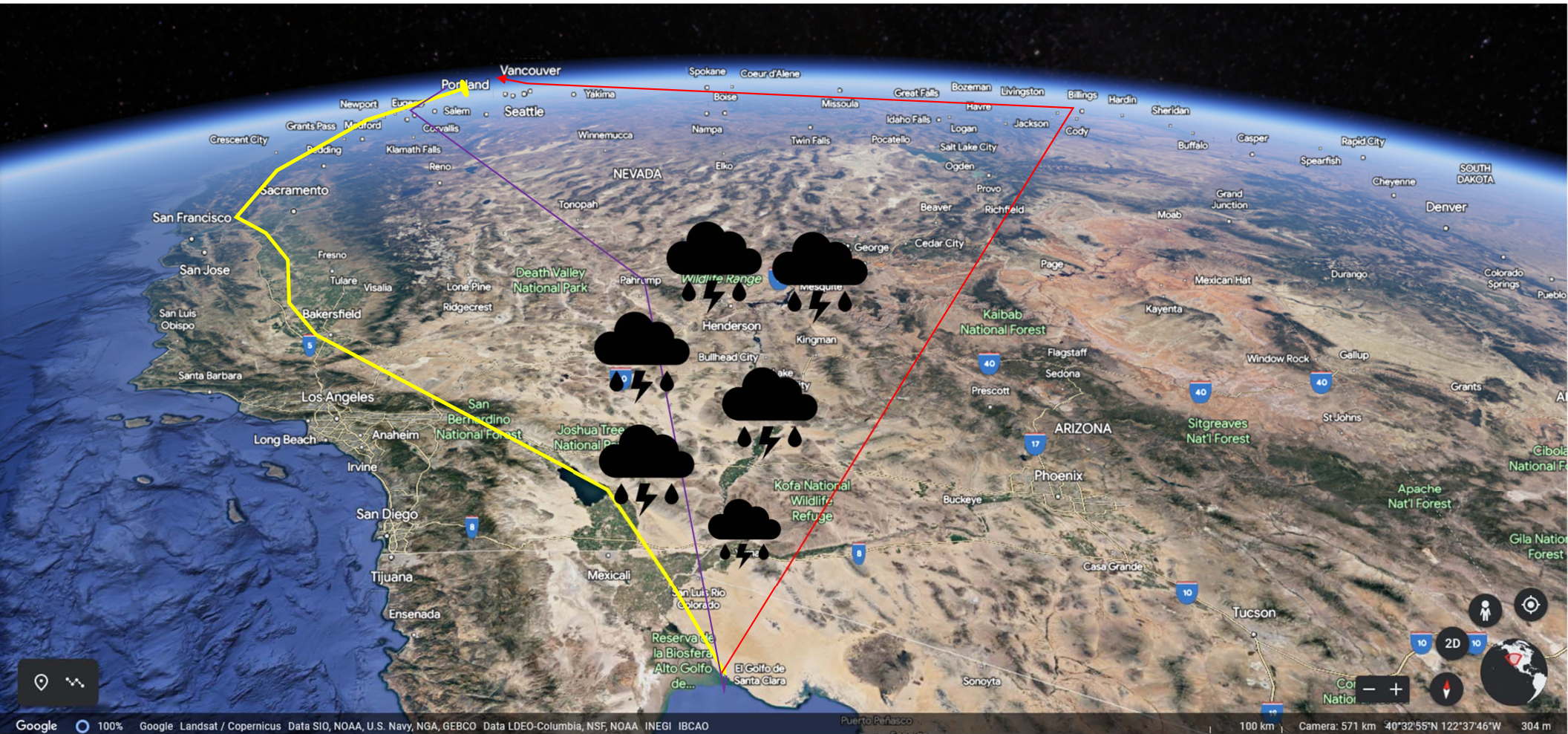
Migratory strategies

Ruta del Desierto



Estrategias migratorias

Migratory strategies



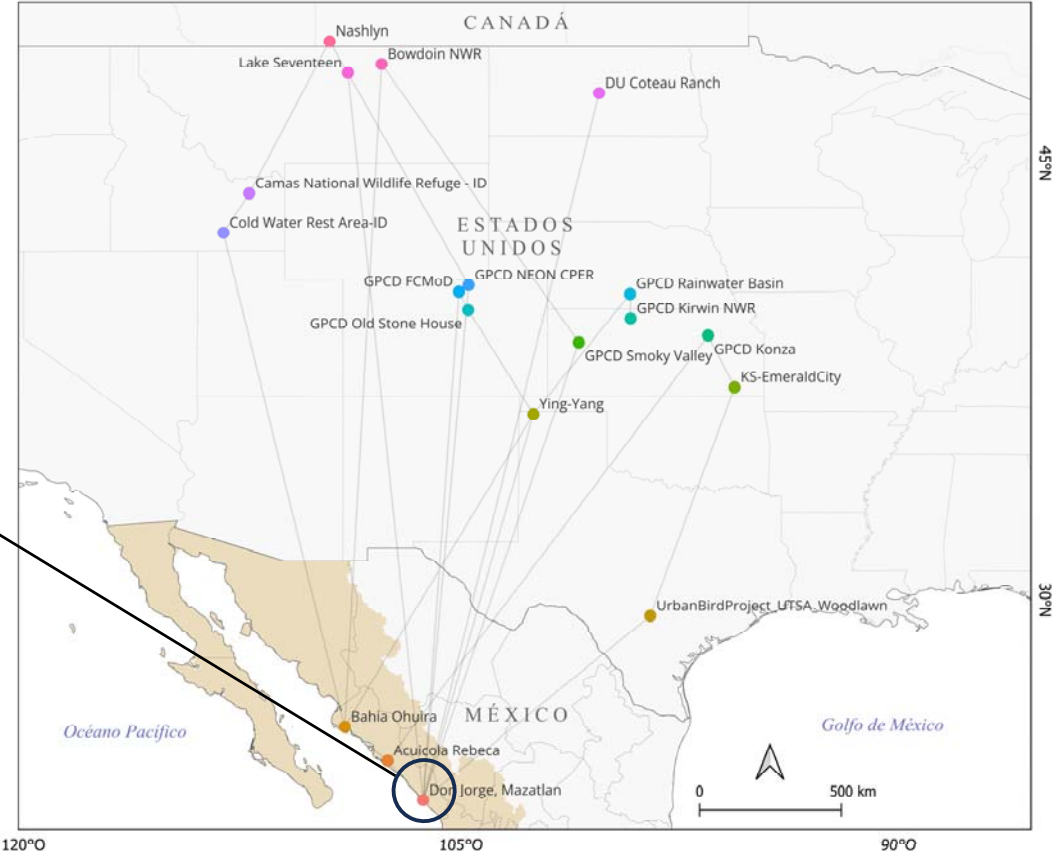
Fidelidad al sitio

Site fidelity

Rutas migratorias del Playero Pihuihui

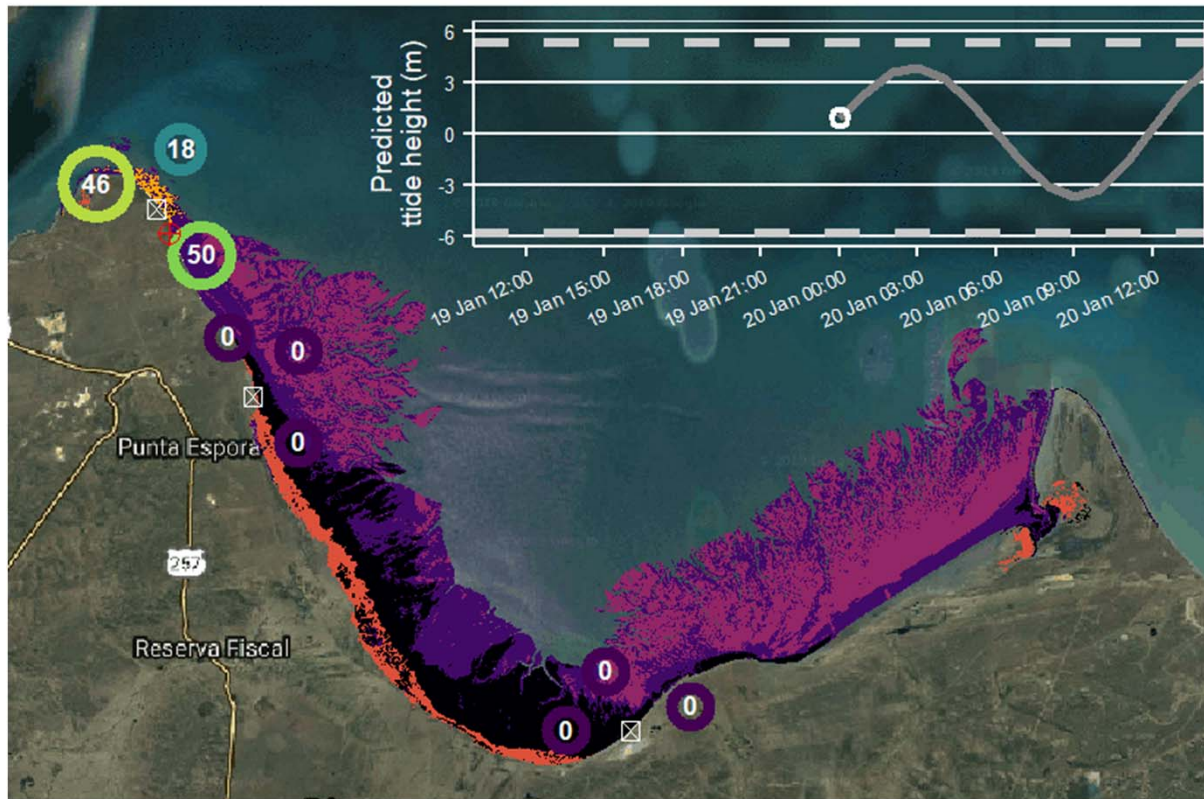


10 marcadas, 8 regresaron
80% return rate



Uso de Habitat

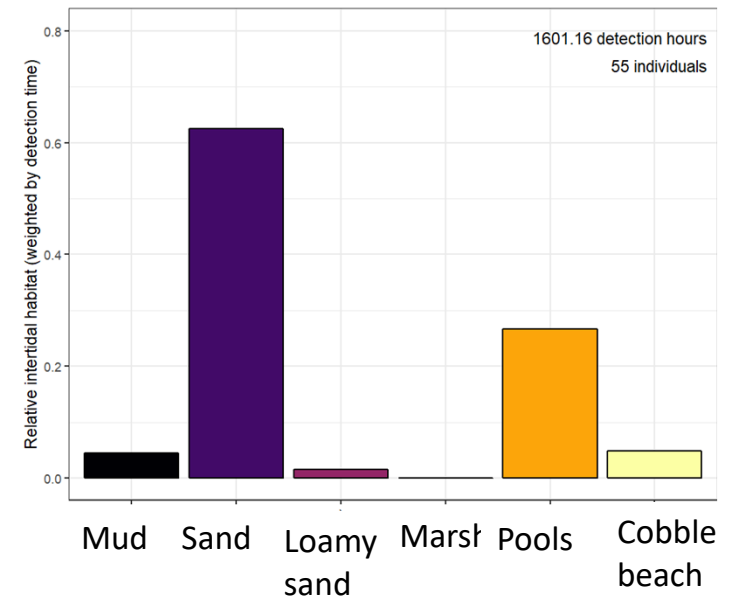
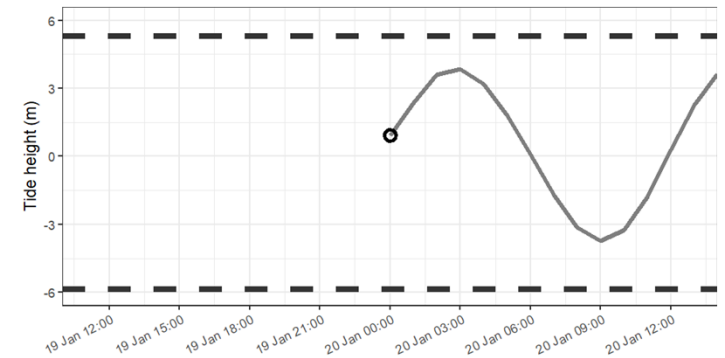
Habitat use



Cumulative detection time:

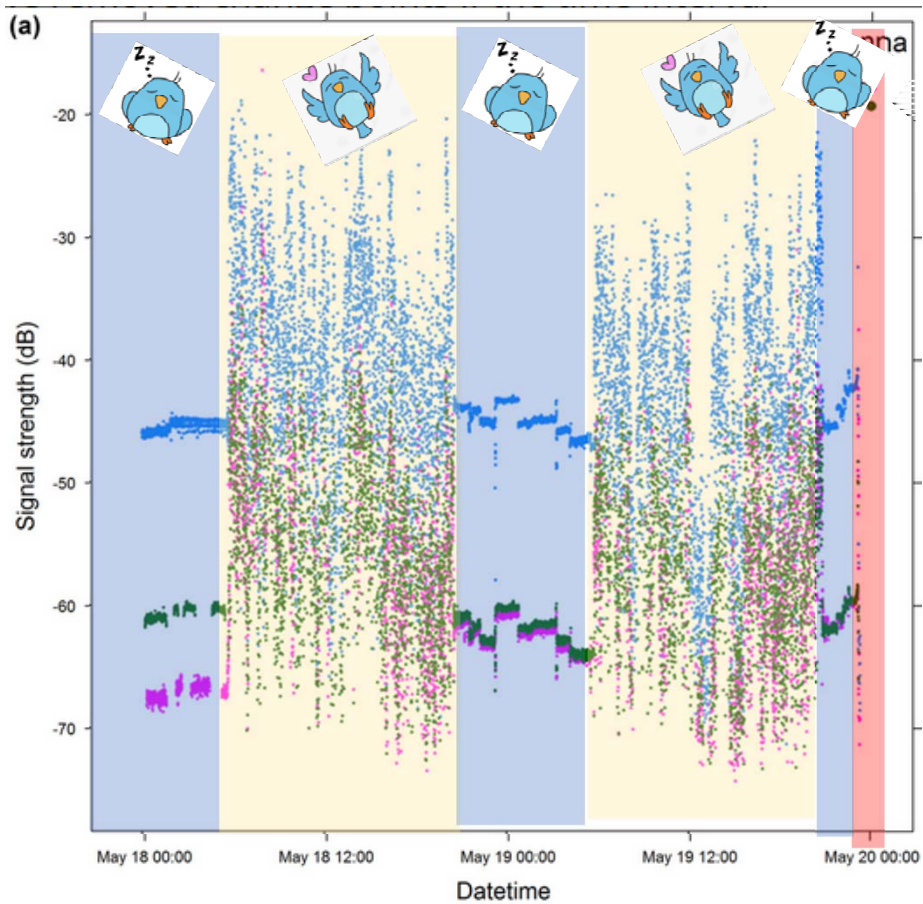


1min 15min 1h 4h 12h 36h



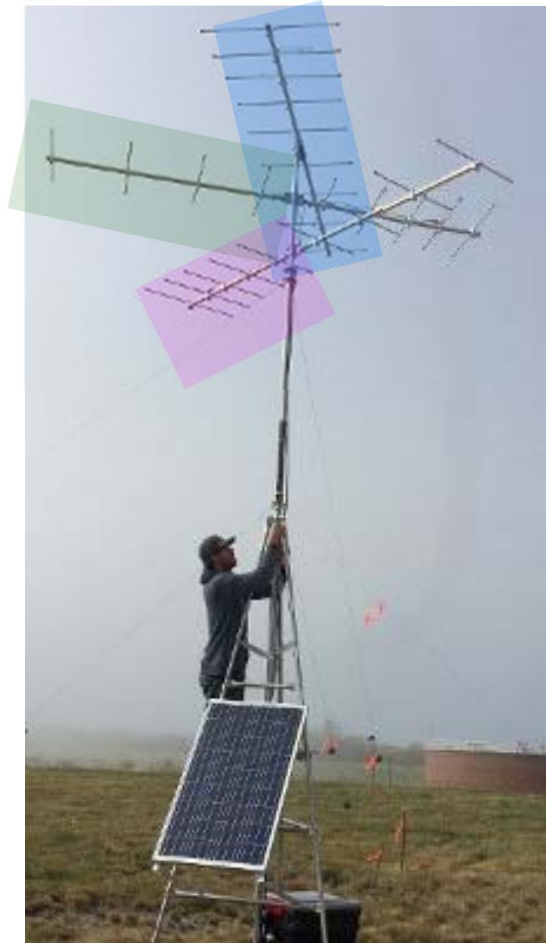
Investigación: comportamiento premigratorio

Research: Pre-migratory behavior



Dos días en la
vida un ave

Two days in a
birds life



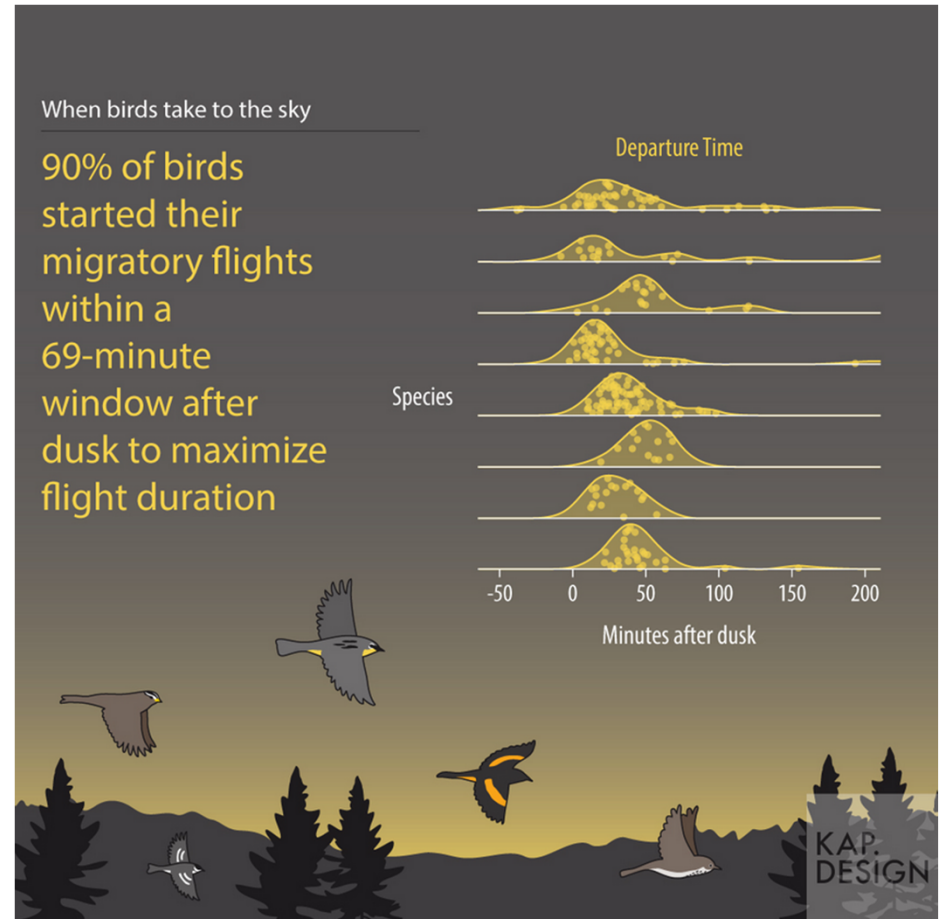
Morbey et al. (2020) *Avian Biology*

Investigacion: ¿a qué horas comienzan a migrar las aves?

Research: what time do birds start migrating?



Cooper et al., 2023a, Cooper et al., 2023b



Conservación: ¿Porque las aves migran para cambiar de plumas?

Research: why do bird make separate migration for molting?

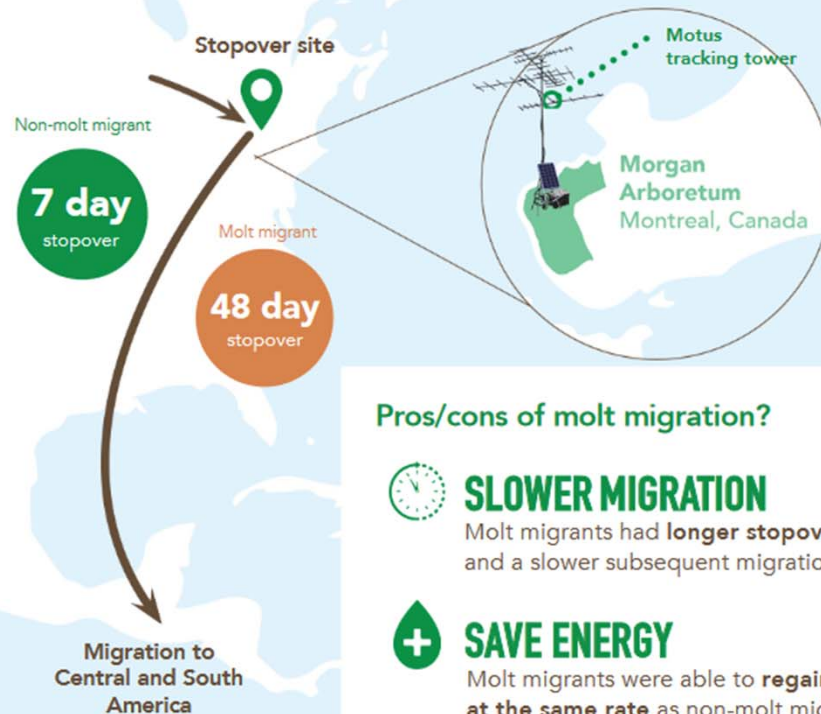
WHY DO *SWAINSON'S THRUSHES* MAKE A SEPARATE MIGRATION FOR MOLTING?

What is molt migration?

After breeding, many birds molt (i.e. replace) their flight feathers in preparation for migration. Since growing new feathers requires a lot of energy, it is usually done during a rest period after breeding and before migration.

Molt migrants, however, make a separate migration from their breeding grounds to a new location to molt. These locations may offer extra food or relief from predators.

Nanotag attached to bird and detected by Motus tracking towers



Pros/cons of molt migration?



SLOWER MIGRATION

Molt migrants had **longer stopovers** and a slower subsequent migration.



SAVE ENERGY

Molt migrants were able to **regain energy at the same rate** as non-molt migrants, despite being **less active**.



We found that molt migrants use their Montreal stopover to trade time for energy.



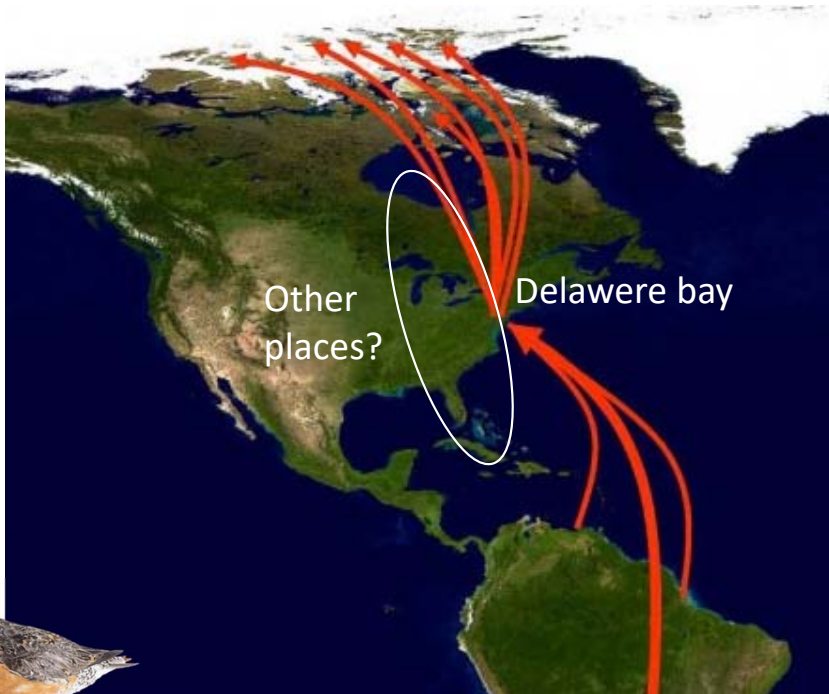
Importancia del sitio Gran Parc de l'Ouest

Conservation importance of Gran Parc de l'Ouest

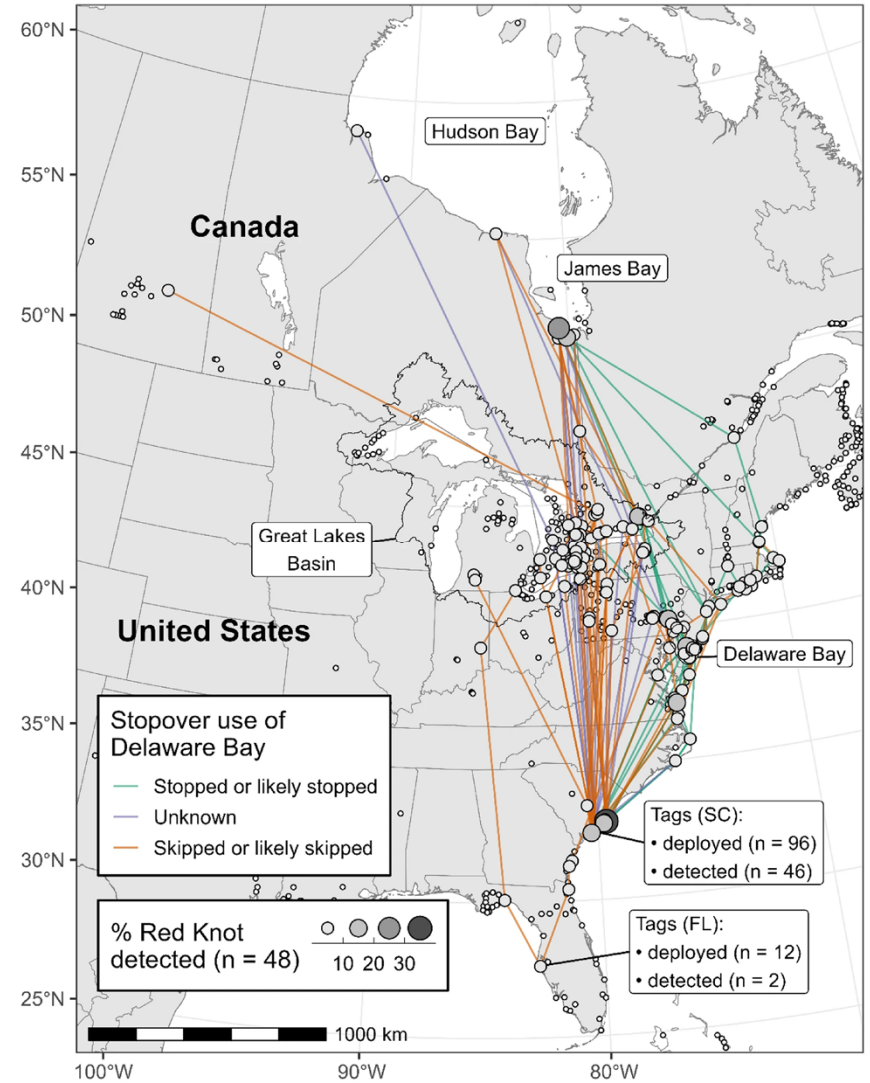
Conservacion: Priorizando sitios

Conservation: Priotizing sites

Delware Bay es el sitio mas importante durante su migracion. ¿Será?
Delaware bay is the most importante site during migration ¿Is it?



Smith et al. 2023



Recuerden: Motus no es solo para aves!

Remember: Motus is not only all about birds!



CTT – BlūMorpho



Nanotag on Bat

Expandiendo la red Motus en México y más allá.
**Expanding the Motus network in Mexico and
beyond**



www.pronatura-noroeste.org

Retos usando Motus en los neotrópicos

Challenges using motus in the neotropics

En 2020, pocas personas en LATAM sabian como usar Motus
In 2020, few people in LATAM new how to use Motus



Conseguir componentes
Getting components



Radio comunicaciones
Radiocomunicaciones



Electrical expertise
Electrical expertise



Construccion
Construction



Transmisores y marcado de aves
Transmitters and bird tagging

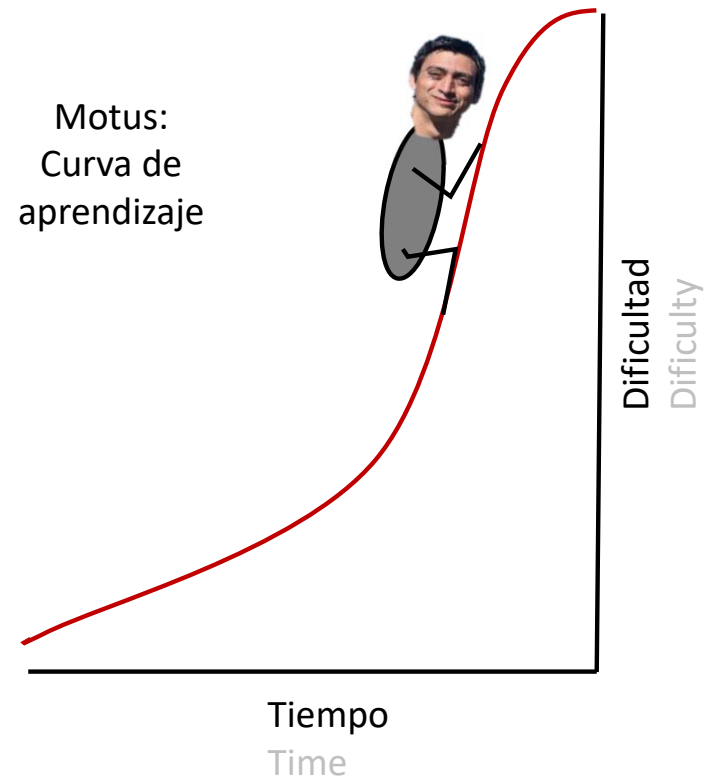


Motus: una curva de aprendizaje

Motus: a learning curve

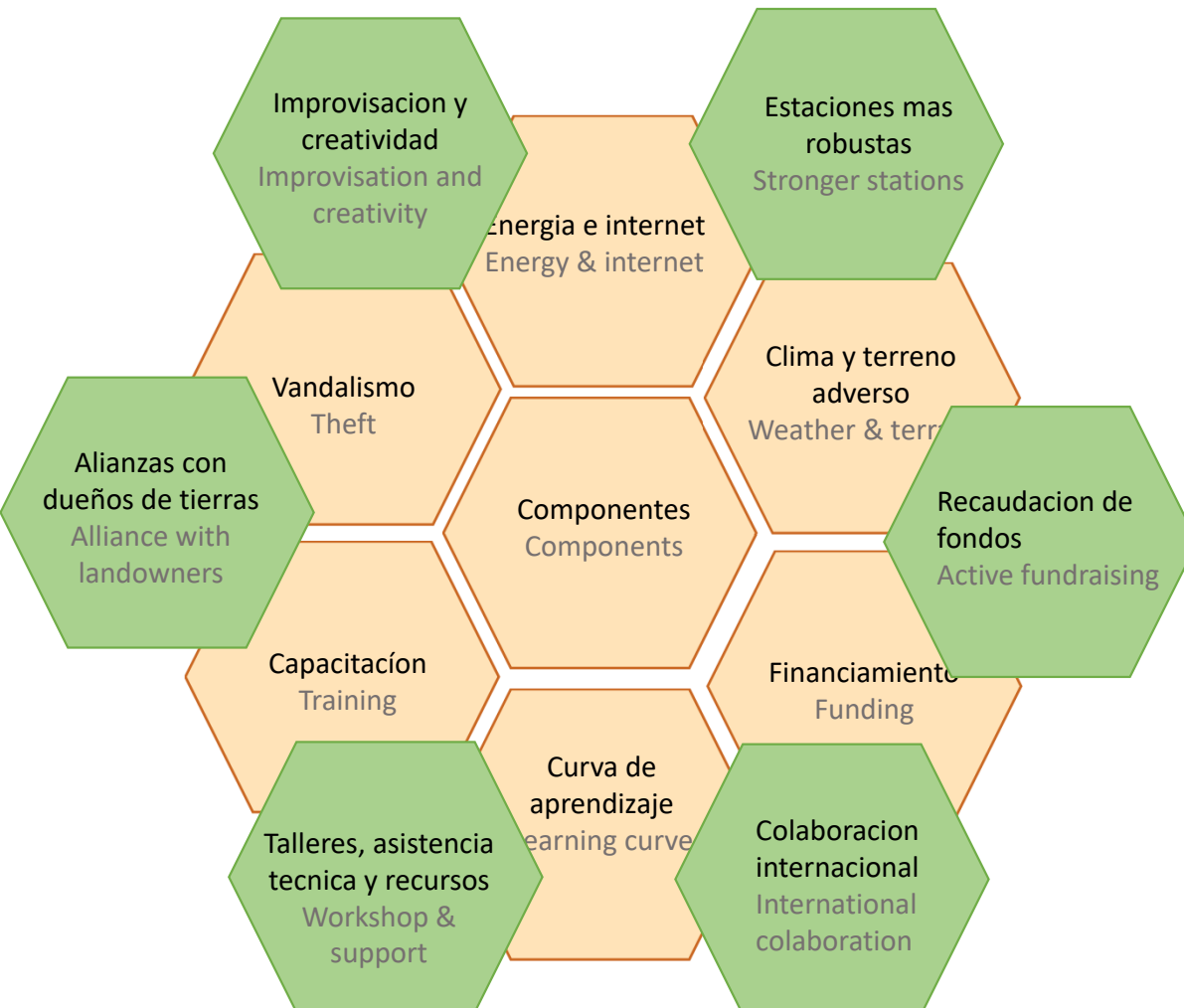


Motus:
Curva de
aprendizaje



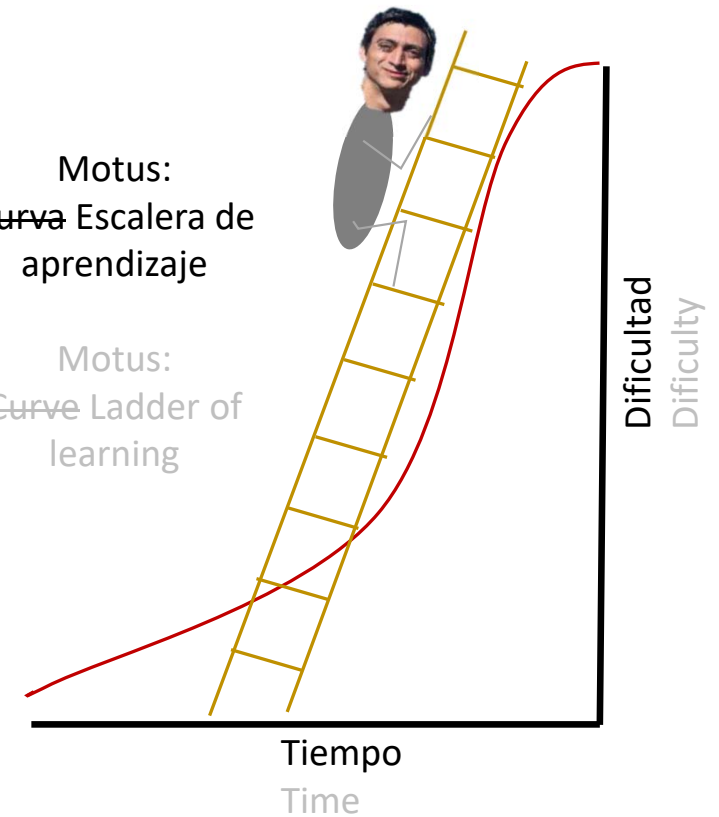
Motus: una curva de aprendizaje

Motus: a learning curve



Motus:
Curva Escalera de aprendizaje

Motus:
Curve Ladder of learning



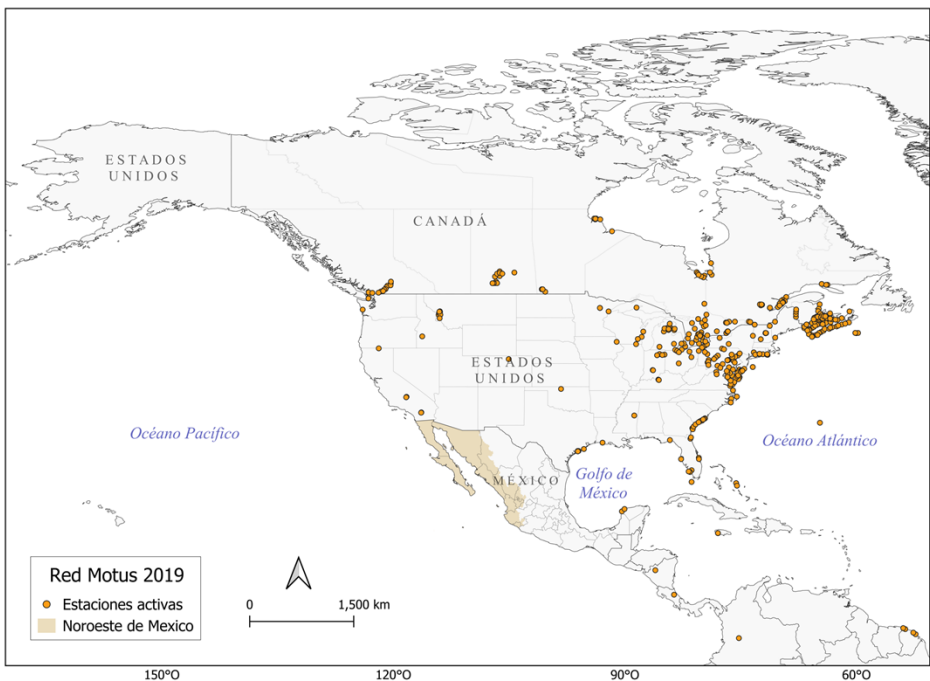
La expansión de Motus en México

Motus expansion in México

La red Motus en 2019

Motus network in 2019

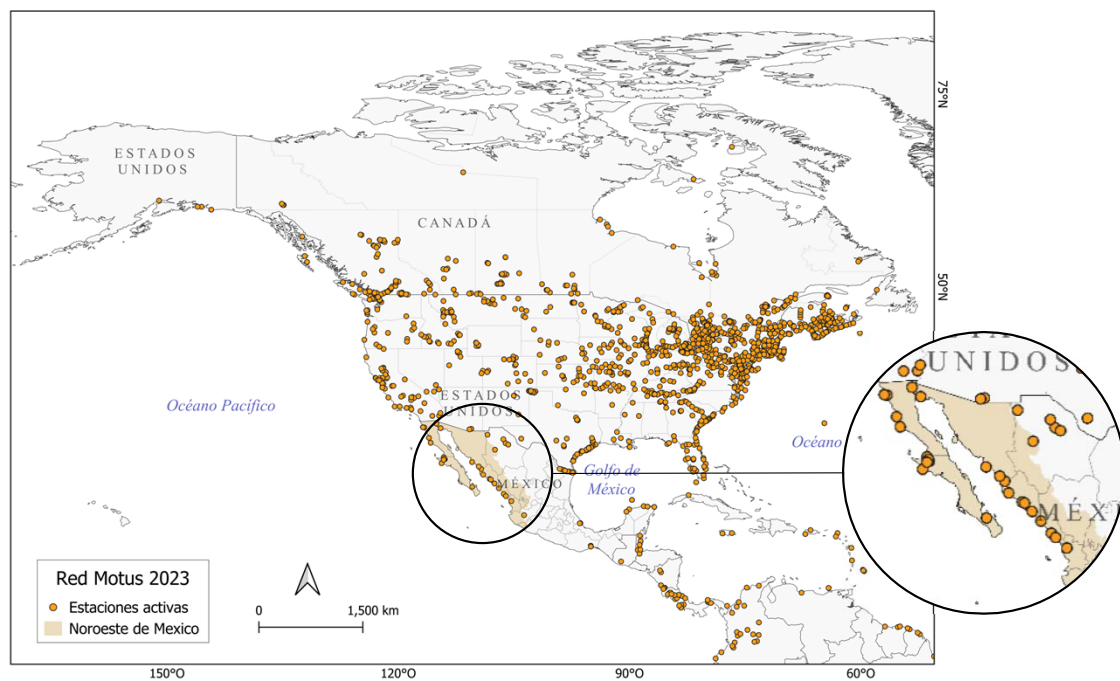
México:	2 estaciones
Noroeste de México:	0 estaciones
Ruta migratoria del Pacífico:	15 estaciones



La red Motus en 2023

Motus network in 2023

Mexico:	40 estaciones
Noroeste de Mexico:	24 estaciones
Ruta migratoria del Pacífico:	200+ estaciones

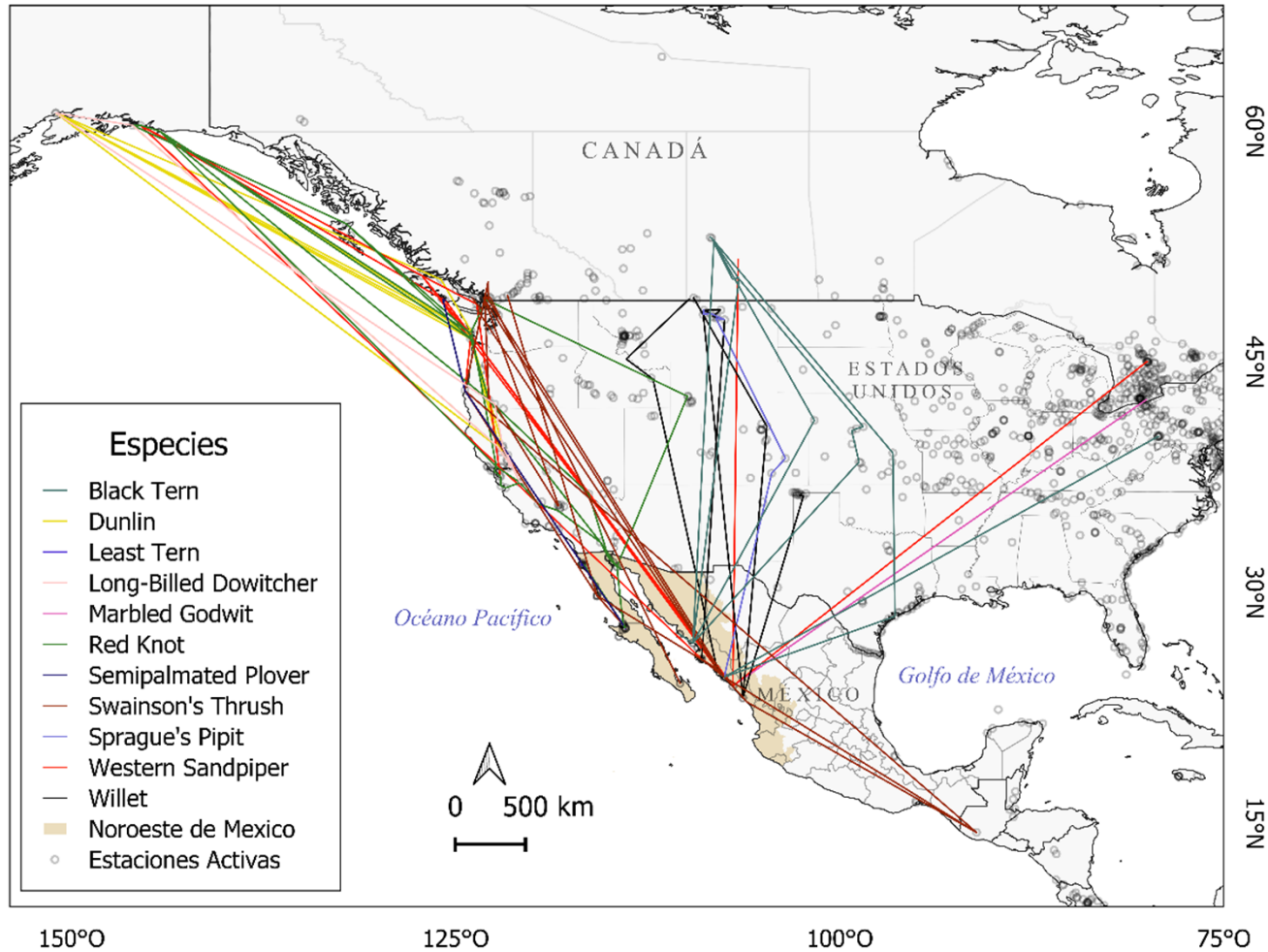


Top 10 de las especies detectadas

Top 10 species detected



Nuestras aves



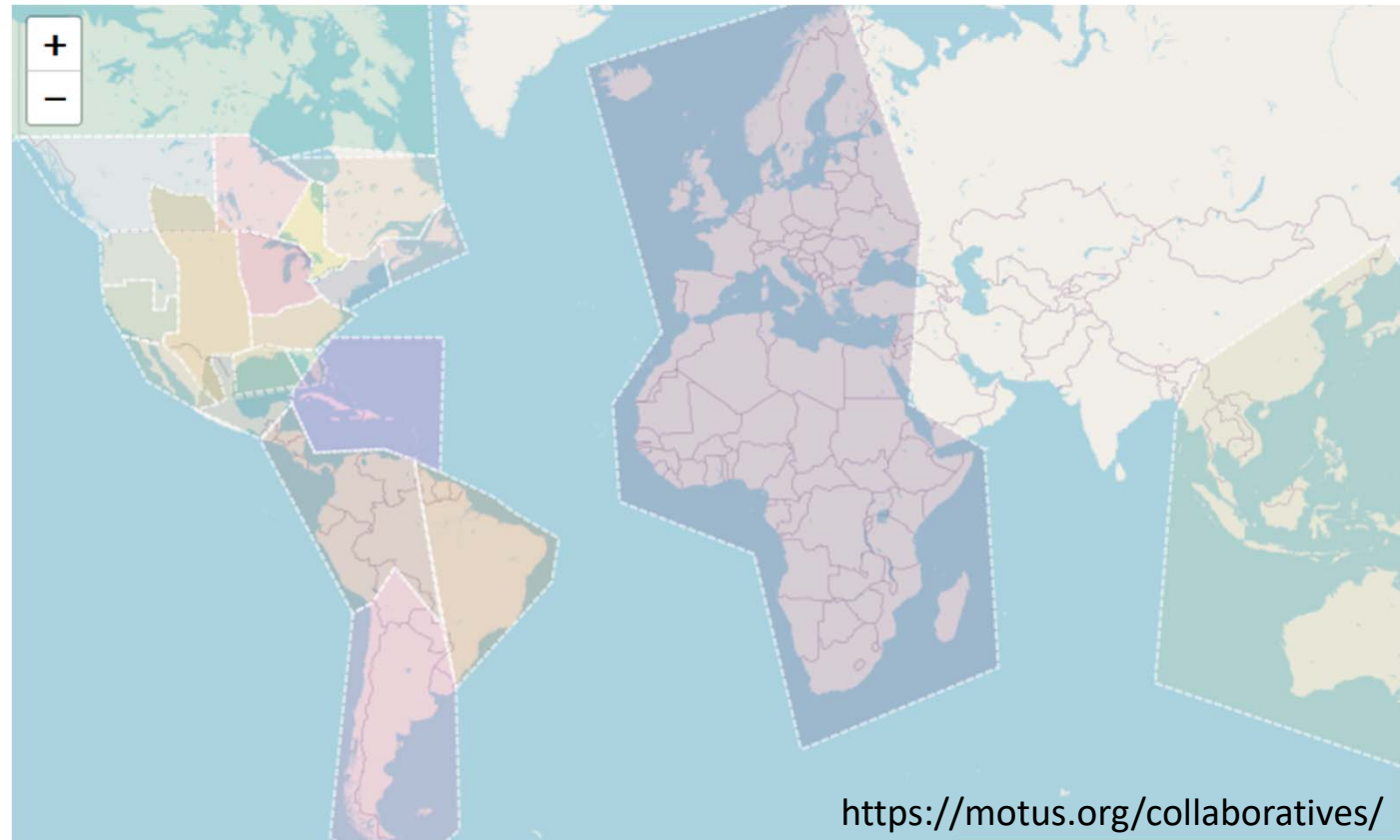
Otros investigadores

Campeones regionales: grupos de coordinación

Regional champions: coordination groups

Meetings:

- **Coordinación regional**
Regional coordination
- **Investigación y divulgación**
Research and outreach
- **Análisis de datos**
Data analysis
- **Sostenibilidad**
Sustainability
- **Tecnología**
Technology
- **Financiamiento.**
Funds



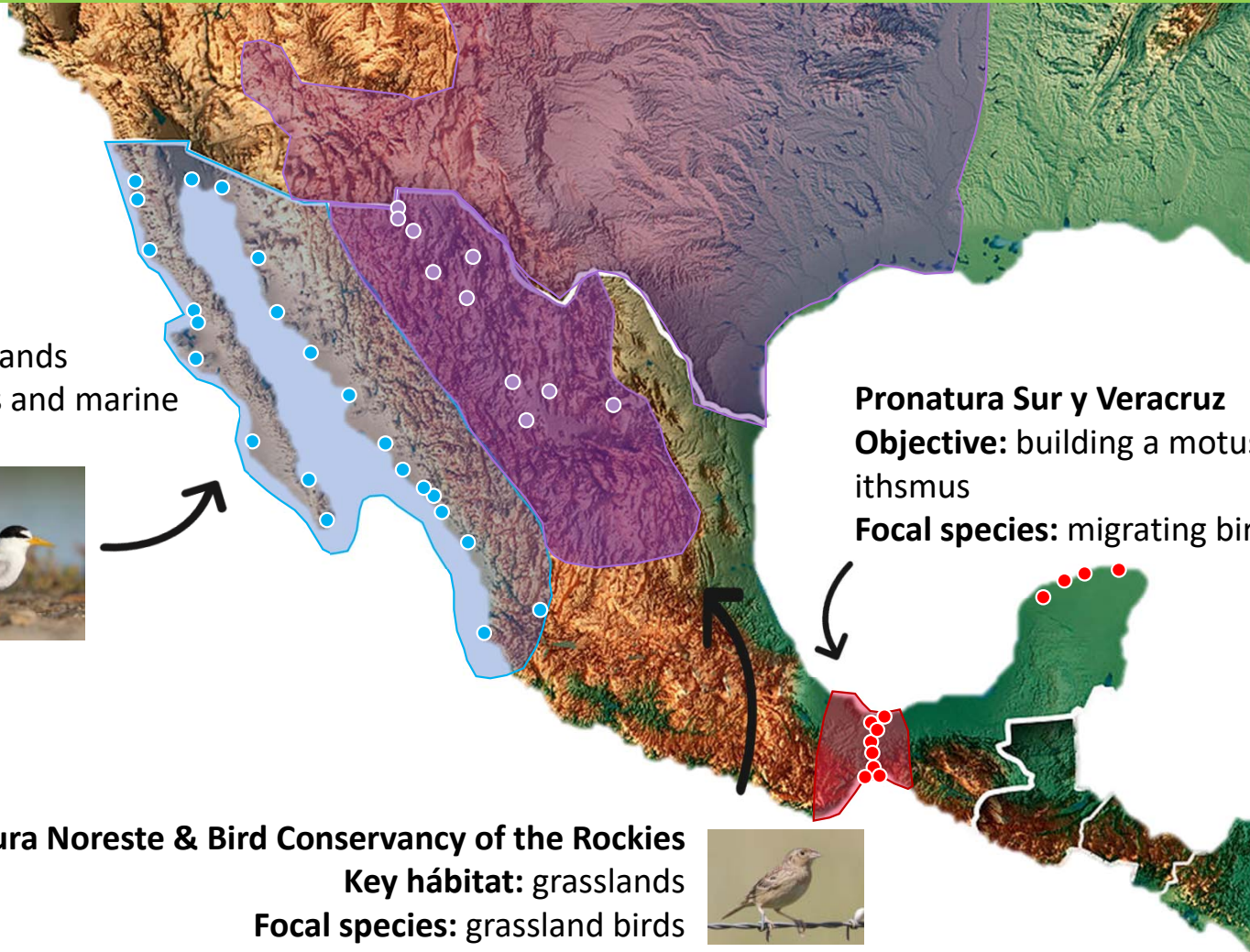
Un ejemplo: Mexico

An example: Mexico

Pronatura Noroeste

Key hábitat: coastal wetlands

Focal species: shorebirds and marine birds



Pronatura Sur y Veracruz

Objective: building a motus wall in the isthmus

Focal species: migrating birds



Pronatura Noreste & Bird Conservancy of the Rockies

Key hábitat: grasslands

Focal species: grassland birds



Como financio mi estación y mis transmisores

How do I fund my station and my tags

PASO 1: Encuentra a tu bandada con objetivos similares

STEP 1: Find your Flock with similar objectives

- Especies focales
 - Areas geográficas
 - Proyectos
 - Preguntas de investigación
- Focal species
Geographic areas
Projects in common
Research questions

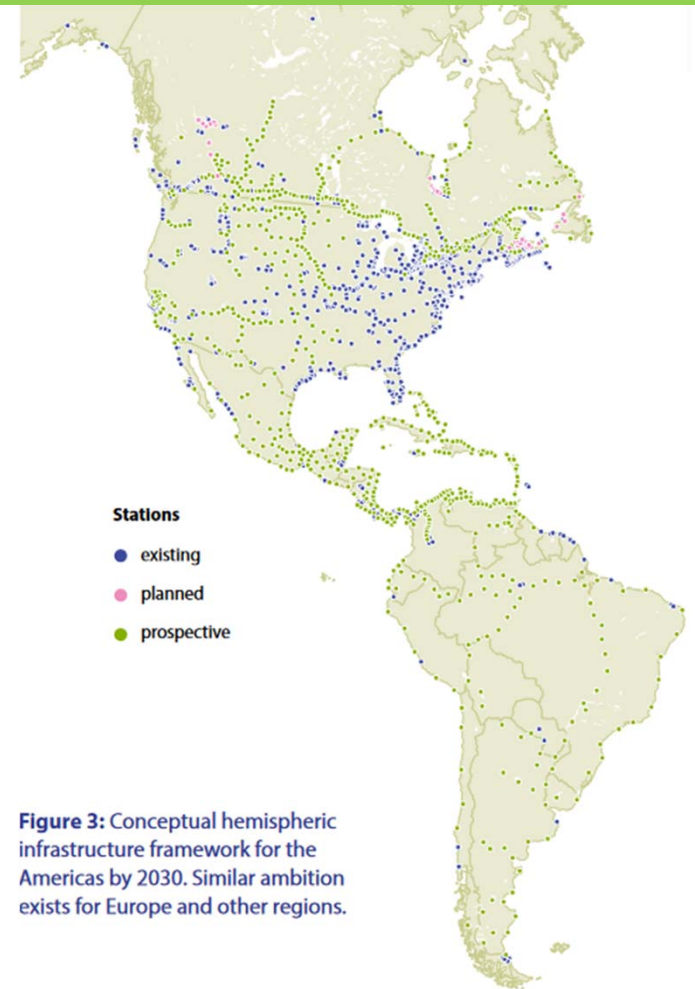
PASO 2: Colaboración

PASO 2: Colaboration

- Propuestas compartidas
 - Division de tareas
 - Aprovechar expertise
- Joint proposals
Division of tasks
Harness others expertise

PASO 3: Aprovecha el momentum.

STEP 3: Harness momentum



Regiones distintas: oportunidades y retos distintos

Different regions: different opportunities and challenges



Especies distintas: oportunidades y retos distintos

Different species: different opportunities and challenges

